AMENDMENT OF THE SPECIFICATION

Page 7, amend the first full paragraph to read:

The present invention has been made in view of the circumstances described above. Accordingly, the purpose of the present invention is to solve the above-mentioned subject. According to the present invention, the sampling tube-type smoke detector comprises a smoke detection device which detects smoke particles contained in the air suctioned through a sampling tube from a monitored area; an aspirator positioned in the downstream of the smoke detection device; the smoke detection device forms ~~an almost~~ a substantially straight line to a lead-in tube which draws suctioned air through the sampling tube; a smoke sensor unit detects smoke particles contained in the air of the lead-in tube; the aspirator forms the actuator mechanism of a rotating part that discharges the air; and the lead-in tube and the aspirator are oriented with the central axis of the lead-in tube and the rotational axis of the actuator mechanism of the aspirator being ~~almost~~ substantially the same axis ~~axle~~.

Page 7, amend the paragraph spanning pages 7 and 8 to read:

According to the present invention, the lead-in tube and the aspirator are arranged so the lead-in tube is formed in ~~an almost~~ a substantially straight line along the central axis of the lead-in tube and the rotational axis of the actuator mechanism of the aspirator are ~~almost~~ substantially on the same axis ~~axle~~. The air duct from the smoke detection device leading to the aspirator can be formed in ~~an almost~~ a substantially straight line and pressure loss in the airflow can be suppressed to a minimum. As the smoke detection device and the aspirator can be formed compactly, the smoke detection device can be miniaturized and driven by a small-sized fan.

Page 8, amend the third full paragraph to read:

According to the present invention, in the sampling tube-type smoke detector the

lead-in tube essentially resembles ~~an almost~~ a substantially round-shaped cross-sectional form. The lead-in tube and the expanded part are connected with the connection part. The connection part inner wall surface connects to the lead-in tube inner wall surface and the expanded part inner wall surface in a reciprocally continuous smooth curved surface.

Page 8, amend the last full paragraph to read:

Further, in this invention, the lead-in tube is effective in suppressing the pressure loss of the airflow by vortex flow generated in the rotating part of the aspirator by being essentially formed in ~~an almost~~ a substantially round shape.

Page 9, amend the first full paragraph to read:

In addition, according to this invention, the lead-in tube is made with a sequentially mutual wall side of the adjacent parts consisting of a segment formed in ~~an almost~~ a substantially square-shape and a segment formed in ~~an almost~~ a substantially round-shape, respectively. In order for the airflow of the lead-in tube to meet in a straight line with the connection part, they are formed together as one piece. As the flow path of the lead-in tube is designed to not produce a level difference, by forming the lead-in tube with the connection part as a mutually sequential smooth curved surface, airflow pressure loss can be suppressed.

Page 9, amend the second paragraph to read:

According to the present invention, in the sampling tube-type smoke detector, the expanded part inner wall surface which is sequentially formed to the lead-in tube through the connection part resembles ~~an almost~~ a substantially semi-sphere shape. The expanded part is formed in series with the aspirator.

Page 9, amend the third paragraph to read:

Furthermore, as the expanded part is formed in ~~an almost~~ a substantially semi-sphere shape in the inner wall surface and installed sequentially by the aspirator, it effectively optimizes the abatement of pressure loss in the connection part.

Page 9, amend the fourth paragraph to read:

According to the present invention, in the sampling tube-type smoke detector, the connection part is equipped with a thin metal-like aperture. The aperture has an aperture diaphragm opening smaller than the inside diameter of the lead-in tube central part and in the center of the aperture diaphragm opening is arranged ~~almost~~ substantially on the centerline of the lead-in tube.

Page 10, amend the first full paragraph to read:

Further, in this invention, as the aperture diaphragm opening is a diameter smaller than the inside diameter of the lead-in tube central part and the aperture is fixed so that the center of the aperture diaphragm opening is arranged to be ~~almost~~ substantially centerline with the flow path of the lead-in tube, the airflow streaming down the lead-in tube 10 can be controlled as well as decreased air pressure. Also, as the aperture diaphragm opening consists of a diameter approximately 30 to 70 percent in size as compared to the inside diameter of the lead-in tube, the aperture is effectively optimized.

Page 13, amend the first full paragraph to read:

The sampling tube-type smoke detector in this embodiment comprises a sampling tube **3** with suction openings **42** formed in a monitored area. A smoke detection device **1** detects smoke particles contained in the air suctioned through the sampling tube **3.** An aspirator **2** is formed in the downstream of the smoke detection

device **1**. The smoke detection device **1** and the aspirator **2** connect by way of an inter-connection part **15**. Among those which constitute the sampling tube-type smoke detector, the smoke detection device **1**, the aspirator **2**, and the inter-connection part **15** are placed in a detector main body **20**, which consists of a cube-type configuration as shown in FIG. **1**. In addition, the smoke detection device **1** is connected with the sampling tube **3**. The air drawn from the sampling tube **3** through the smoke detection device **1** is discharged outside from the aspirator **2**. This air duct, from an inflow **11** of the smoke detection device **1** until ending at the inflow point of the aspirator **2** without bending, forms ~~an almost~~ a substantially straight line shape and decreased pressure by way of pressure loss is suppressed.

Page 14, amend the first full paragraph to read:

As shown in FIG. **7**, the sampling tube **3** is composed of a T-shaped line formed in the monitored area and has a detection line **40** with two or more suction openings **42**. The detection line **40** is formed at a perpendicular with a connection line **41** connected to the smoke detection device **1**. As for the detection line **40** and the connection line **41**, both resemble ~~an almost~~ a substantially round- shaped cross-sectional form. The detection line **40** suction openings **42** are located every 1-2 meters (1-2m = about 1-2 yards apart) prescribed spacing and formed in a standard round shape of 1-2 millimeters (1-2mm = about 0.04-0.08 inches) in diameter. The connection line **41** is formed in ~~an almost~~ a substantially straight line shape and connected to a lead-in tube **10** of the smoke detection device **1** in ~~an almost~~ a substantially straight line. Thus, the centerline of the connection line **41** is approximately in a direct line with the centerline of the lead-in tube **10** and oriented to ~~almost~~ substantially coincide.

Page 14, amend the paragraph spanning pages 14 and 15 to read:

As shown in FIGS. **3** and **4**, the smoke detection device **1** is equipped with a smoke sensor unit **4** which detects smoke particles in the lead-in tube **10** formed in ~~an~~

~~almost~~ a substantially straight line from the air inflow **11** connected to the sampling tube **3** to an air outflow **12**. Additionally, the smoke detection device **1** consists of a Light-Emitting Diode **5** (hereafter referred to as LED **5**) for performing sensitivity tests of the smoke sensor unit **4** and an airflow sensor **6** which measures the flow velocity. Thus, the lead-in tube **10** of the smoke detection device **1** is formed in ~~an almost~~ a substantially straight line, without bending the air duct from the inflow **11** until reaching the outflow **12**. Therefore, since the centerline constitutes ~~an almost~~ a substantially direct line, the connection line **41** of the sampling tube **3** and the inflow **11** of the lead-in tube **10** until reaching the outflow **12** is formed sequentially on ~~an almost~~ a substantially straight line.

Page 15, amend the first full paragraph to read:

The lead-in tube **10** essentially resembles ~~an almost~~ a substantially round-shaped cross-sectional form entirely. However, the segment around the inflow **11** of the lead-in tube **10** resembles ~~an almost~~ a substantially square-shaped cross-sectional form where the four corners are beveled. In this ~~almost~~ substantially square-shaped section, the smoke sensor unit **4** and the airflow sensor **6** are attached sequentially from the upper part and form a stationary portion **14**. FIG. **6** shows the lead-in tube **10** the part formed in ~~an almost~~ a substantially square-shaped cross-sectional segment in which the smoke sensor unit **4** is attached. The lead-in tube **10** is then formed in ~~an almost~~ a substantially round-shaped cross-sectional segment in the downstream portion from the mounting locations of the adjacent inflow **11** and the airflow sensor **6**. The downstream part of the lead-in tube **10** (i.e., the cross-sectional segment near the aspirator **2**), is also formed in a substantially ~~an almost in a~~ round shape. This has an effect on the airflow produced in the rotary motion of a rotating part **32** of the aspirator **2**, which is suppressed at a low level and pressure loss is reduced as much as possible.

Page 16, amend the first paragraph to read:

In this way, because the sectional form changes along the way, the lead-in tube **10** causes a level difference in adjacent parts **18**a and **18**b of the ~~almost~~ substantially square-shaped cross-sectional segment and the ~~almost~~ substantially round-shaped cross-sectional segment, respectively. Except these adjacent parts **18**a and **18**b form a smooth curved surface of the ~~almost~~ substantially square-shaped cross-sectional segment and the ~~almost~~ substantially round-shaped cross-sectional segment to respectively continue sequentially. Consequently, the fact that the adjacent parts **18**a and **18**b are formed so that the different cross-sectional form segments continue in series, they do not cause airflow turbulence and air pressure loss in the lead-in tube **10** is suppressed at a low level.

Page 16, amend the second paragraph to read:

The smoke sensor unit **4** for detecting smoke particles which flow inside the lead-in tube **10** of the smoke detection device **1** segment resembles ~~an almost~~ a substantially rectangle-shaped cross-sectional form. The smoke sensor unit **4** is formed in the upper part of the segment resembling ~~an almost~~ a substantially square-shaped cross-sectional form, (i.e., the stationary portion **14** near the inflow **11** of the lead-in tube **10**). Since the smoke sensor unit **4** is formed in a location distant from the aspirator **2**, this lessens the effects of vortex flow (spiral motion) and the like on the smoke sensor unit **4** from the aspirator **2** formed in the downstream of the lead-in tube **10**.

Page 19, amend the first full paragraph to read:

In the segment resembling ~~an almost~~ a substantially square-shaped cross-sectional form of the lead-in tube **10**, the airflow sensor **6** is formed in the downstream part of the smoke sensor unit **4**. As the airflow sensor **6** as well as the smoke sensor unit **4** is attached to the stationary portion **14** located in the upper part of the lead-in tube **10**, it is hardly vortex flow and the like influenced from the rotating part **32** of the

aspirator **2**. A thermal type element with a thermistor component is used for the airflow sensor **6** and formed without protruding into the flow path of the lead-in tube **10**. In this manner, without disrupting the airflow, pressure loss is prevented.

Page 20, amend the first full paragraph to read:

As shown in FIGS. **8** and **9**, the aspirator **2** constitutes a discharge part **31** in the body part **30** equipped with the rotating part **32** and an actuator mechanism **33**. The body part **30** forms the rotating part **32** and the actuator mechanism **33** in the center. The air duct **36** is located spaced between a periphery line **35** of the rotating part **32** and the body part **30**. Also, the contour of the body part **30** is formed in ~~an almost~~ a substantially cylinder shape so that the air duct **36** located in the periphery to the rotating part **32** constitutes ~~an almost~~ a substantially constant width.

Page 20, amend the second full paragraph to read:

As shown in FIG. **8**, the rotating part **32** holds the centrifugal fan blades **32**a. The centrifugal fan blades **32**a feed air to the periphery from the central part in a rotary motion. The centrifugal fan blades **32**a are formed by a turntable **32**b, which connects the actuator mechanism **33** with the centrifugal fan blades **32**a. The periphery line **35** of the centrifugal fan blades **32**a constitute ~~an almost~~ a substantially round shape, where between the periphery line **35** of the centrifugal fan blades **32**a and the body part **30** forms the air duct **36**. The actuator mechanism **33** comprises a motor and is connected with the turntable **32b** of the rotating part **32**. For this reason, the rotating part **32** and the actuator mechanism **33** are constituted considering a rotational axis **34** as the same axle.

Page 21, amend the paragraph spanning pages 21 and 22 to read:

Additionally, it is advisable to install a cap **37** in the discharge part **31** according to the circumstances of the physical relationship of the discharge part **31** located in the

detector main body **20**. More specifically, when a discharge vent **31**a is placed closer to the center rather than the periphery of the aspirator **2**, in this position it causes a level difference in the periphery of the air duct **36** and the discharge vent **31**a in the body part **30**. Therefore, in order to smooth the flow path applied to the discharge vent **31**a from the periphery of the air duct **36** in the body part **30**, attach the cap **37** in the aspirator **2**. The cap **37** constitutes the segment used as the discharge vent **31**a, and the segment for attaching in the aspirator **2**. The discharge vent **31**a resembles ~~an almost~~ a substantially round-shaped cross-sectional form, and it is arranged at the center closer to the periphery part of the aspirator **2** when the cap **37** is attached in the aspirator **2**. A guide **37**a is formed in the cap **37**. The guide **37**a is applied to the discharge vent **31**a from the air duct **36** located in the periphery of the body part **30**, and constitutes to connect the flow path into a smooth curve. In this way, by forming the air duct **36** in the discharge part **31** of the aspirator **2** into a smooth curve, the air pressure loss produced by a level difference can be reduced, and the discharge vent **31**a can be arranged in the desired position of the detector main body **20**.

Page 22, amend the paragraph spanning pages 22 and 23 to read:

As shown in FIG. **4**, the inter-connection part **15** has an expanded part **17** where the flow path expands along the direction of air movement, and connects the lead-in tube **10** of the smoke detection device **1** to the expanded part **17** by a connection part **16**. The expanded part **17** resembles ~~an almost~~ a substantially semi-sphere shape in the inner wall surface. The connection part **16** makes the lead-in tube **10** and the expanded part **17**, which are formed in ~~an almost~~ a substantially straight line, continue in a smooth curve. The expanded part **17** formed in ~~an almost~~ a substantially semi-sphere shape in the inner wall surface is arranged ~~almost~~ substantially on the centerline of the lead-in tube **10**. The air flows down a straight line flow path in lead-in tube **10**, and also without bending in the inter-connection part **15**, which is made to flow down to the aspirator **2**.

Page 23, amend the first full paragraph to read:

The inter-connection part **15** can be connected to the smoke detection device **1** and the aspirator **2** without narrowing the flow path from the lead-in tube **10** to the aspirator **2**. This is achieved by having the expanded part **17**, which forms the inner wall surface in ~~an almost~~ a substantially semi-sphere shape. Concerning the contour of the expanded part **17**, besides the ~~almost~~ substantially semi-sphere shape, connecting a cylindrical element which has a larger inside diameter compared with the lead-in tube **10** or an element formed in ~~an almost~~ a substantially cone shape and ~~an almost~~ a substantially trumpet shape have been considered. However, in this invention, the element formed in an ~~almost~~ a substantially semi-sphere shape is the most preferred.

Page 24, amend the first full paragraph to read:

As shown in FIGS. **4** and **5**, an aperture **50** with an aperture diaphragm opening **51** is formed in the central part of the connection part **16**. The aperture **50** is made of round thin metal. The aperture diaphragm opening **51** is a diameter smaller than the inside diameter of the lead-in tube **10** central part. The aperture diaphragm opening **51** consists of a diameter approximately 30 to 70 percent in size as compared to the inside diameter of the lead-in tube **10**. Additionally, the aperture **50** is fixed so that the center of the aperture diaphragm opening **51** is arranged to be ~~almost~~ substantially centerline with the flow path of the lead-in tube **10** and the inter-connection part **15**.

Page 25, amend the first full paragraph to read:

A connection flange **19** is formed in a connection opening **13** which is the vent for the inter-connection part **15**. The connection flange **19** and the aspirator **2** are connected with screws. In this case, as shown in FIG. **8**, the aspirator **2** is installed in the smoke detection device **1** so the flow path of the lead-in tube **10** may be countered. Thus, the rotating part **32** of the aspirator **2** and the rotational axis **34** of the actuator mechanism **33** are arranged in a straight line and formed to be ~~almost~~

substantially centerline of the lead-in tube **10**. Thereby, from the lead-in tube **10** to the inflow of the inter-connection part **15** and the aspirator **2**, the flow path is formed in ~~an almost~~ a substantially direct line.

Page 25, amend the paragraph spanning pages 25 and 26 to read:

Thus, by forming an air duct in the detector main body **20** in ~~an almost~~ a substantially direct line, air pressure loss in the smoke detection device **1** or the inter-connection part **15** can be suppressed to the minimum. Although the aspirator **2** constitutes a centrifugal fan that is smaller-sized than before, a predetermined airflow rate can be achieved. Therefore, the smoke detection device **1**, the aspirator **2**, and the inter-connection part **15** in the detector main body **20** can be formed compactly. As a larger space can be secured in the detector main body **20** compared to conventional sampling tube-type smoke detectors, the control apparatus **21**, the power supply **22** and the like can be made built-in the detector main body **20** and miniaturization of the entire device can be attained.

Page 27, amend the first full paragraph to read:

Although only one embodiment of this invention was explained until now, this invention should not be limited to the embodiment described above, but may be realized in forms which are variously different within the limits of the technological concept. For example, in this embodiment, in regard to the lead-in tube **10** and the inter-connection part **15** being formed in one piece, by remaking these as separate elements, respectively, they also may well be oriented on the centerline of the expanded part **17** and ~~almost~~ substantially centerline of the lead-in tube **10**. In this embodiment, the aperture **50** was formed in the inlet port of the inter-connection part **15**. However, even if the aperture **50** is not necessarily provided, should the lead-in tube **10**, the inter-connection part **15** and the aspirator **2** be arranged in a straight line, reduction of the air pressure loss can be promoted.